Flying Safety

HEADQUARTERS UNITED STATES AIR FORCE • [redacted] • AUGUST 1950

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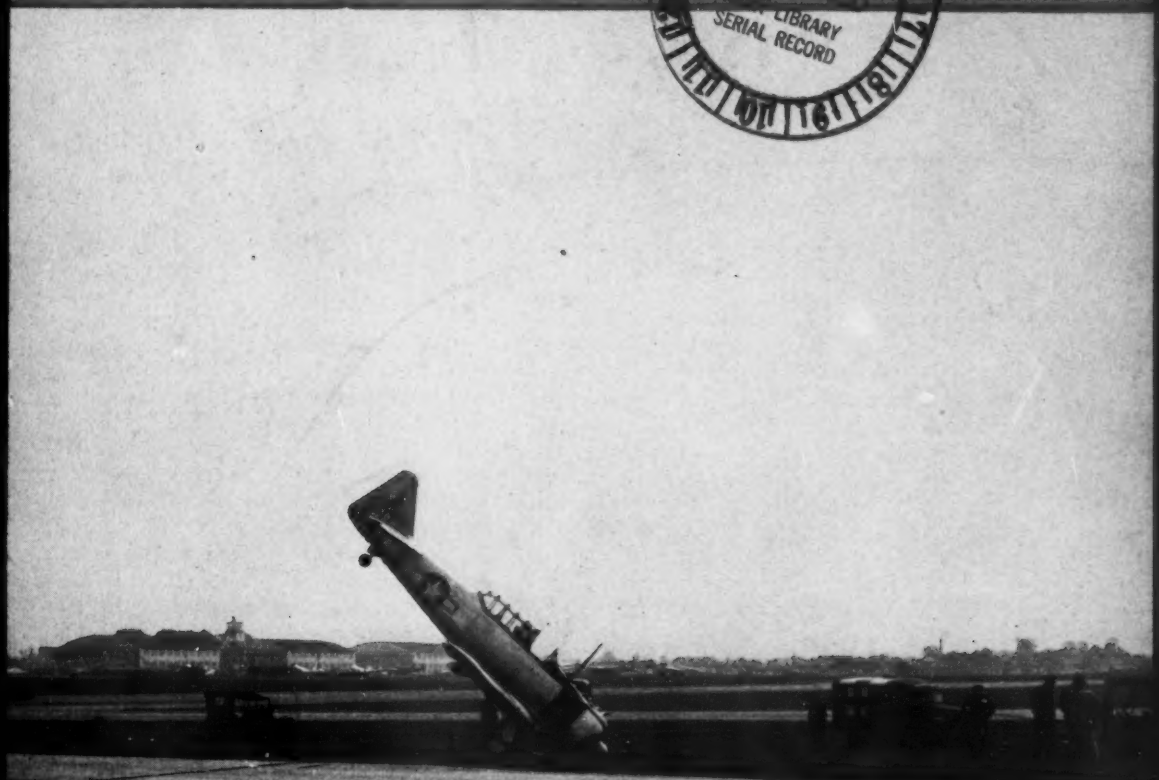

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ID IT RIGHT"

RESTRICTED

INDIVIDUAL RESPONSIBILITY

FOR each forward step taken in the field of aeronautics, more extensive measures are needed for flying safety. We have not yet invented a plane which will not crash. The arrival of our jet aircraft did not coincide with the appearance of superairmen. The same kind of human beings that flew the Flying Jennies are today flying aircraft whose speed exceeds that of sound. And the axiom of flying safety which applied in the early days of air travel is just as appropriate today: The success or failure of any flying safety program or any operational phase of such a program rests with the individual pilot!

Traffic control programs, for example, such as the one recently instituted by the Civil Aeronautics Administration wherein they assume control over all flights of military aircraft on regular American air routes at all times, and the newly developed electronic navigational aids are intended only as assistance to the pilots.

A very necessary campaign of personnel education is being conducted as a supplement to procedural and mechanical safeguards. Unceasing effort is being devoted to combating the same faults and chains of circumstances that have always caused air tragedy—the human element. The only solution to the problem of accidents caused by that all too familiar reason—'pilot error'—begins with the first stages of training of any pilot.

The idea that both the letter and spirit of flying safety regulations must be obeyed at all times must be uppermost in his mind from his very first day in the air. As a cadet, the individual should be trained to develop and exercise his own judgment. He must be made to realize, throughout his career, that he, and he alone, is accountable for his own safety and that of his crew, passengers and aircraft. He must be constantly reminded, until it is an integral part of his thinking, that there is no substitute for good judgment and safe procedures. And he must be taught to expect that swift and stern measures will be taken, should he violate these procedures.

He must realize at all times that the responsibility of being a safe pilot cannot be passed on to another pilot or permitted to rest on the successful functioning of a mechanical gadget. That responsibility of being a safe pilot cannot be passed on to another pilot or permitted to rest on the successful functioning of a mechanical gadget. That responsibility belongs solely, and gravely, to the pilot himself.

Despite all our inventions and research, one fact stands prominent and indisputable: Flying safety can be a successful program, only when every individual who flies a plane realizes and follows these simple axioms.

Ennis C Whitehead

ENNIS C. WHITEHEAD
Lieutenant General, USAF
Commanding, Continental Air Command

LAND IT RIGHT

THROUGHOUT the Air Force, the T-6 airplane is involved in a high proportion of accidents. The airplane has been with us many years. Perhaps this has lead many pilots to take it for granted. They have neglected to attain or regain the high degree of proficiency which this airplane requires.

More than two-thirds of all T-6 accidents occur during the final approach and landing. Accidents caused by pilots who do not regularly fly the trainer are all out of proportion to the number of accidents these same pilots have in other types of airplanes. Where pilots revert back to the T-6 airplane after operating tricycle gear types, we have a considerable increase in accidents.

A study was made of accidents in T-6 aircraft involving pilots whose primary flying duties are not accomplished in the T-6 but in other types of aircraft. Overall time logged in the T-6 by these pilots ranged from 22 to 500 hours. It was found that the average T-6 pilot time flown 30 days preceding an accident was 4:10 hours, and the average T-6 pilot time flown in the preceding 90 days was 8:30 hours.

The cause factor in these accidents was overwhelmingly pilot error—such mistakes as striking a post off the runway after landing roll, losing control by turning off the active runway before slowing down, striking visible runway lights, and failure to maintain complete control of the airplane during the landing. Other factors contributing were landings in crosswinds, inability to maintain directional control on landing roll, confusing landing gear handle for flap handle, and taxiing into other aircraft.

Excessive groundloop and taxi accidents have contributed most to the high T-6 accident rate. Since the T-6 is not the primary aircraft of units other than training command basic flying schools, most pilots fly them infrequently and have low average hours per month in the aircraft. It appears logical that these conditions would lower the pilots' T-6 proficiency and make them more prone to pilot error accidents. In most accident reports, aircraft accident investigation boards recommend more stringent control of training check-out procedures, and in general more closely supervised instruction.

The best safety record in using the T-6 has been and continues to be chalked up by the Air Training Command. Since the Air Training Command knows that the T-6 will be with us for a number of years to come, commanders, supervisors, Flying Safety officers and instructors are constantly evaluating their training methods to turn out pilots safe in the T-6.

These seven Randolph flight instructors have flown a total of 10,000 hours in student flight instruction in the T-6 without accident. From left to right, front row, 1st Lt. W. E. Smith, 1st Lt. J. W. Smith and Capt. R. R. Fredette; back row, 1st Lts. R. L. Melville, E D. Storrs, Jr., H. D. Stewart and C. H. Morrow.

Accidents do not have to happen in the T-6 and the experience of various bases in the Air Training Command has proved that where stringent requirements for pilot check-out are met and where T-6 operations are closely supervised, noteworthy reductions in T-6 accidents occur. At Randolph Air Force Base, for example, there are seven T-6 instructors who have flown a total of more than 10,000 hours while instructing cadets in the T-6, without even a minor accident. These instructors have taught more than 200 aviation cadets to fly, without so much as scraping a wing tip. A large portion of their time was acquired in the rear seat of a T-6, teaching the student the fundamentals and techniques of landing. For example, these 200 students got approximately 75 dual landings each, before being proficient enough for their first solo. That's a grand total of 15,000 landings accomplished under all conditions without an accident.

To prove that this example is not just a case of seven lucky instructors, let's take the case of several representative flights at Randolph:

Capt. E. M. Fritsch commands Flight I-2. His

flight has had no accidents of any kind since July 1949.

Capt. R. A. Cox, commands Flight O-3, which flew 6,250 hours, with no pilot error accidents.

Capt. H. W. Barrick's flight flew 6,666 hours without pilot error accidents.

Supervisors at Randolph, from the base commander down through the flight commanders and instructors are constantly evaluating their training methods. Just because a method was used last year is, in their opinion, no reason for the program to remain as is. They are constantly doing research to determine the best methods of teaching specific phases of flying. For example, the problem of preventing groundloops in the T-6 is a continuing project at Randolph.

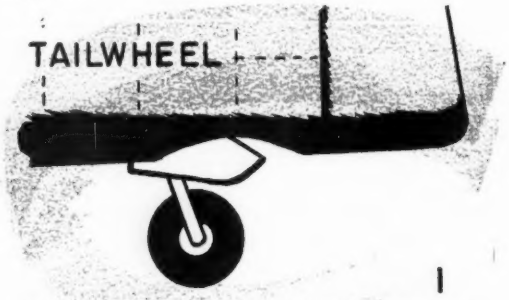
Col. J. G. Fowler, commanding officer at Randolph, believes a good record for accident-free flying in the T-6 is not exclusively a feat of airmanship on the part of any one individual, but the result of untiring efforts of all supervisors to instill correct procedures and flying safety-consciousness in instructors and students. He says, "it is no more proper for the supervisor to relax in his duties than it is for the cadet to relax on the landing roll."

Many Air Force bases are known to have a minimum requirement of one hour's instruction and three landings to check a pilot's proficiency in the T-6. Flying Safety officers who have a thorough knowledge of T-6 operations believe that many accidents start with the check pilot who takes a pilot out for an hour, flies around the traffic pattern three times and says: "OK, you're checked out." This can be avoided only when supervisors take positive steps to require a check which definitely proves a pilot's proficiency. A check-out in the T-6 should not be given exclusively under ideal conditions. Some landings should be made under crosswind conditions, for example.

Meeting minimum requirements or signing the

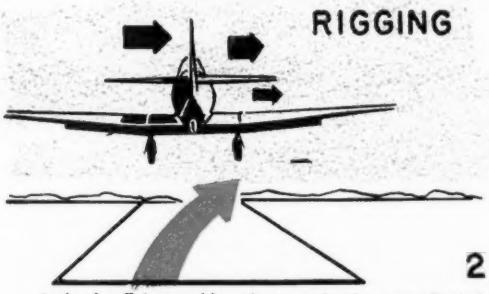
LANDING PLANNING

The T-6 has seven characteristics that affect the performance during the execution of a landing, they are:



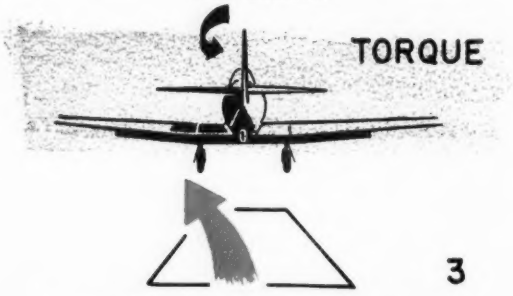
1

The tailwheel should not be unlocked for any landing, nor should it be unlocked during a landing roll and when taxiing at a brisk rate. Tailwheels should be carefully maintained, tension properly adjusted and tire inflated according to tech orders for the particular type of tailwheel installation.



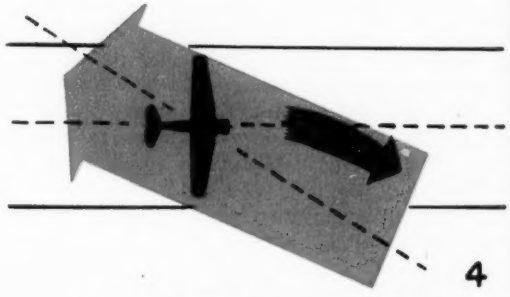
2

Lack of sufficient rudder trim to maintain a coordinated power-off glide (even with a full left trim). Therefore, it is necessary to hold a little left rudder.



3

An appreciable torque effect if power is applied abruptly, in a great amount, and at low airspeed.



4

A pronounced tendency to "weather vane" into the wind after landing crosswind.

certificate of proficiency does not assure that a pilot is safe to fly the T-6. Instructors at Randolph emphasize proficiency rather than amount of flying time. The amount of instruction given to a student in his particular phase of flying is determined by what the student needs to become proficient rather than by the time allotted by training schedules.

Because final approach and landing accidents account for 70 per cent of the total accidents involving the T-6, these costly losses can be reduced greatly if we tackle the problem causing the most trouble. That problem is how to land the T-6 without incident. The Flying Safety office at Randolph AFB has, with the cooperation of the base training and operations office, provided the following pointers on T-6 operations for publication in FLYING SAFETY Magazine. The basic lessons in planning and executing a safe landing can, if observed by you as a pilot, help you through the phase of flight where most USAF accidents occur.

IDEAL LANDING IN A T-6

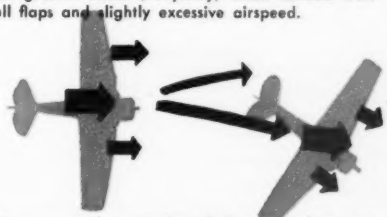
A successful landing in a T-6 is started with the pattern. The downwind leg must be set in closely enough so that the pilot can accurately judge where to position the base leg. If traffic allows, the base leg is set in close enough so that the power may be fully reduced when the point of intended landing is 45 degrees from the track of the T-6 on base. At the time the throttle is cut on base, the air speed should be 110 miles per hour. After cutting the throttle a glide of 100 miles per hour is established. The final turn is a gliding turn at 100 miles per hour, using a medium bank.

Upon completing the turn on final, the airspeed is slowed to 90 miles per hour and flaps are extended. The normal landing in T-6 is made with full flaps. Some correction can be made for overshooting or under-shooting the runway by varying slightly the position where the throttle is cut and/or by varying the position where the flaps are lowered.

The round-out for landing is started from about 75 feet in the air. The height above the ground where the round-out starts will vary with the wind condition. With a light wind or no wind, the round-out must be started higher. With a strong wind, it must be delayed. In the ideal landing, the round-out is a *smooth, continuous* and *even* process. The

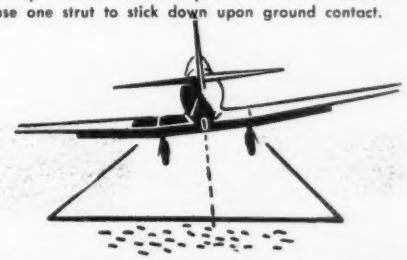
5 LANDS TOO HOT

Noticeable ground effect (buoyancy) when landed with full flaps and slightly excessive airspeed.



6

Frequently worn and/or maladjusted oleo struts that often cause one strut to stick down upon ground contact.



7

A fairly high center of gravity compared to the distance between the wheels. This condition is conducive to a lateral instability in ground turns. Furthermore, this condition is intensified by a low oleo strut.

AIRBORNE

WING DOWN

STEPS IN PLANNING THE LANDING

Fouled-up landings, or even accidents, can result from poor planning on the traffic entry or peel-off, turn-on approach, roundout, landing and roll. That is why you must use the ABCDEF method in making every landing. It is not merely recommended: it is a MUST, for it will assure correct landing planning. Here it is:

A—Analyze the landing situation.

B—Base leg set properly.

C—Correct early on approach.

D—Decide whether or not to land.

E—Execute the landing.

F—Follow through.

stick should come back at a constant steady rate throughout the round-out and landing. Three things should occur at the same time: (1) the aircraft reaches a three-point attitude, (2) in a stalled condition, (3) approximately six inches off the ground. On landing the stick is kept fully back. Directional control is maintained by the use of rudder pedals, through the tailwheel and brakes.

CROSSWIND TECHNIQUE IN A T-6

After turning onto the final approach with a crosswind condition, the wing into the wind should be lowered sufficiently to kill the drift so as to maintain a straight track over the ground on a line parallel to the center line of the runway. The center line of the fuselage should be kept parallel to the center line of the runway by using rudder opposite to the lowered wing. This results in a slip and this attitude is maintained throughout the approach, the round-out and the landing itself. In a good crosswind landing, touchdown will be accomplished with the wing low, low wheel and the tailwheel first. After the aircraft is landed the stick must be kept fully back to apply pressure on the tailwheel and thus give directional control through the tailwheel. Directional control should be aided by the use of brakes. If at any time the success of the landing is in doubt, power should be applied and a go-around effected.

USE OF FLAPS

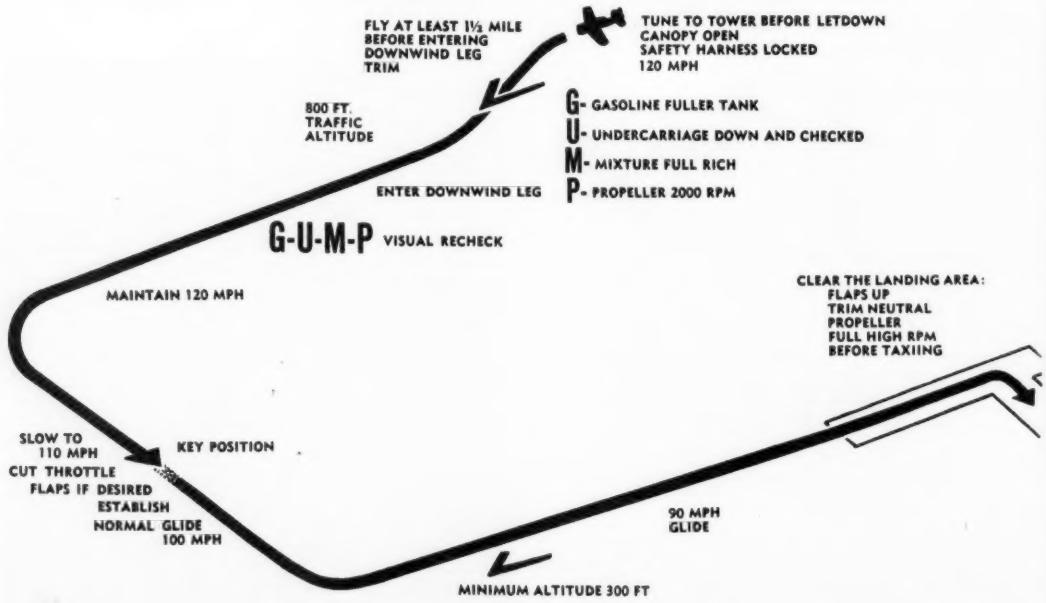
The degree of flaps to be used is a highly controversial matter and currently based principally upon personal opinion. A study is now under way to determine on both a scientific and practical basis the best flap settings for various wind conditions. Pending these findings the following recommendations are made:

1. The normal landing for a T-6 is a full-flap landing.
2. With calm, or light wind, full-flap landings definitely should be made.
3. With a wind straight down the runway, full flaps should be used.
4. With a crosswind, flaps should not be used to the extent that the slip method of drift correction cannot be used to control the drift.

COMMON ERRORS IN LANDING T-6

Most errors in landing a T-6 are the result ot failure to follow correct technique. This is frequently based upon the pilot's lack of familiarity with the characteristics of the aircraft and his

LANDING PROCEDURE



apprehension over the landing. Mistakes are usually accumulative:

Cause Factor	*Accumulative Cause Factors Leading to Errors*
1. Fast Glide	Nose-low-attitude (Diving at runway)
2. Delaying start of round-out	1
3. Abrupt round-out	1, 2
4. Floating	1, 2, 3
5. Ballooning	1, 2, 3, 4
6. Landing wheels first	1, 2, 3, 4, 5
7. Failure to hold drift correction	1, 2, 3, 4, 5
8. Landing with crab	1, 2, 3, 4, 5, 7
9. Weak ground control	1, 2, 3, 4, 5, 6, 7, 8
10. Ground loop	1, 2, 3, 4, 5, 6, 7, 9

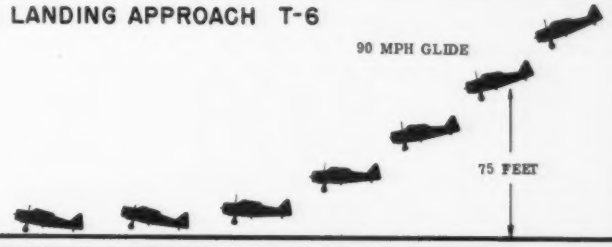
A fast glide will frequently cause the round-out to be delayed too long. This necessitates an abrupt round-out which will always cause an excessive floating and usually will cause the aircraft to balloon. Landing from such an approach and round-out will usually be main-landing-gear-first. Also, such a round-out may result in failure to hold the drift correction, since drift is difficult to detect in such a tail-high attitude. Consequently, the aircraft lands in a crab. The sideward motion of the aircraft will immediately start the aircraft to swerve or a wing to drop, or both. The center of gravity and the weathervaning characteristics of the T-6 will accelerate the turning tendency. Unless ground control is prompt and proper, a groundloop can result, for once the aircraft has gone so far, nothing can be done to stop it. Other factors which may contribute to an unsuccessful landing in a T-6 are:

1. Over-shooting the final turn which results in
2. "S-ing" on the final approach
3. Drag-in approaches which are dangerous and make landings more difficult because of poor visibility and difficult drift detection.

Above all the main cause of T-6 landing accidents is a tendency for the pilot to relax as soon as the aircraft is on the ground. The landing problem is not solved at this point, but is at its most difficult stage. The aircraft must be controlled completely until the engine is shut off.

IDEAL LANDING APPROACH T-6

After turning onto approach, reduce airspeed to 90 mph. Lower flaps to steepen glide for better visibility. Begin round-out about 75 feet above ground, gradually raising nose until three-point attitude is reached as plane lands. Bring stick all the way back to place pressure on tail wheel to help maintain directional control.

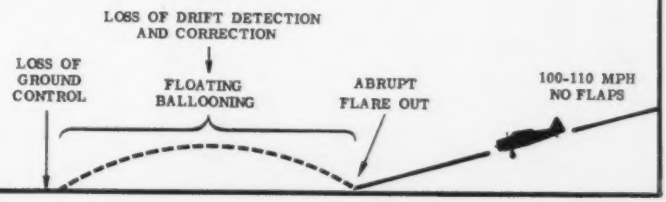


CROSSWIND TECHNIQUE T-6

On final approach lower wing into wind to maintain track on line with runway. Keep fuselage lined up with runway during roundout, with wing lowered to counteract drift. As aircraft stalls in a 3-point attitude, wind acting on side of fuselage will tend to level wings as contact with runway is made. After contact maintain directional control with rudders and brakes if necessary and move stick into a high wing. If unable to hold directional control, add power and "go around."

COMMON ERRORS IN LANDING T-6

Many pilots land the T-6 in this manner: a fast flat glide of approximately 110 mph, partial power on, and very little flaps. They tend to dive the aircraft at the runway and then level off, floating just above the runway, making contact main wheels first with the aircraft still at flying speed. Due to the center of gravity and the action of any crosswind hitting the vertical stabilizer, the T-6 tends to yaw into the wind and rudder and brakes must be used to keep it straight.



MEDICAL SAFETY

PROTECTIVE HELMETS

As man departed from his so-called natural element and leaped off into the wild blue yonder, the stresses and strains imposed by flying sometimes became more than he could stand. Because of his fragility, it soon became apparent that if he were to continue in this ambition to conquer the elements, something was needed to soften the blow.

Early in the development of protective equipment, he realized that the housing of this amazing brain of his was highly vulnerable to external blows. Consequently, a considerable share of his creative efforts was devoted to the design of a protective helmet. And down through the years he added improvement after improvement until finally we come to protective headgear in its present form, known as the Helmet, Flying, Pilot's Protective, Type P-1A, Specification MIL-H-5290 (USAF).

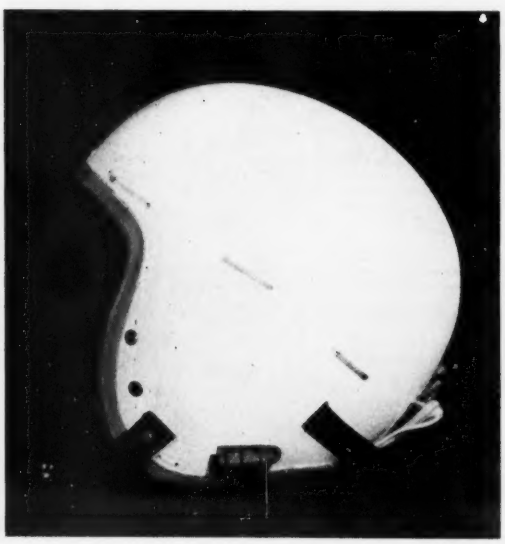
The Type P-1A Protective Helmet consists of a rigid outer shell, an inner suspension harness, neck strap, throat strap, oxygen mask attaching tabs, and built-in communication headset with the receiver and microphone conductors cabled in one lead to a composite plug. It differs from the Type P-1 Helmet presently in use by the substitution of a throat strap instead of a chin strap and the addition of a neck strap in the back.

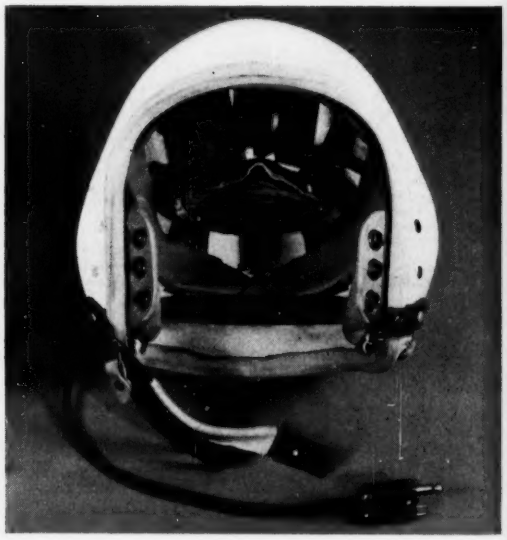
Surely, now the engineers could sit back to survey a job well done, but hardly had the swish of slide rules died away and the last drawing board splinter settled to the floor, when they had to solve another problem. Heads, like apples, came in assorted shapes and sizes. Since it would be impracticable to custom fit a hard hat for each pilot, they had to make the helmets adjustable.

Helmets were designed in two sizes: small and large. It is important to note here that there is no relationship to the Too Small or Too Large customarily employed in the design of military clothing. The small size is adjustable from size 6½ to 7¼, the large size from 7 to 7¾. An interesting tidbit of statistics is that the large size will fit approximately 60 to 70% of flying personnel. About 9000 large size Type P-1A Helmets are now on contract. The Type P-1 Helmets now in service will, after modification, be designated size small.

Using the proper size is extremely important because of the principle of shock absorption utilized. The sling acts as a cradle for the shell and helps to absorb energies through its stretch. Insufficient clearance between the helmet shell and the pilot's head might result in injuries.

To put the helmet on his head, the pilot places the neck strap against the back of his head at neck, pulls the side plates outward to clear his ears and





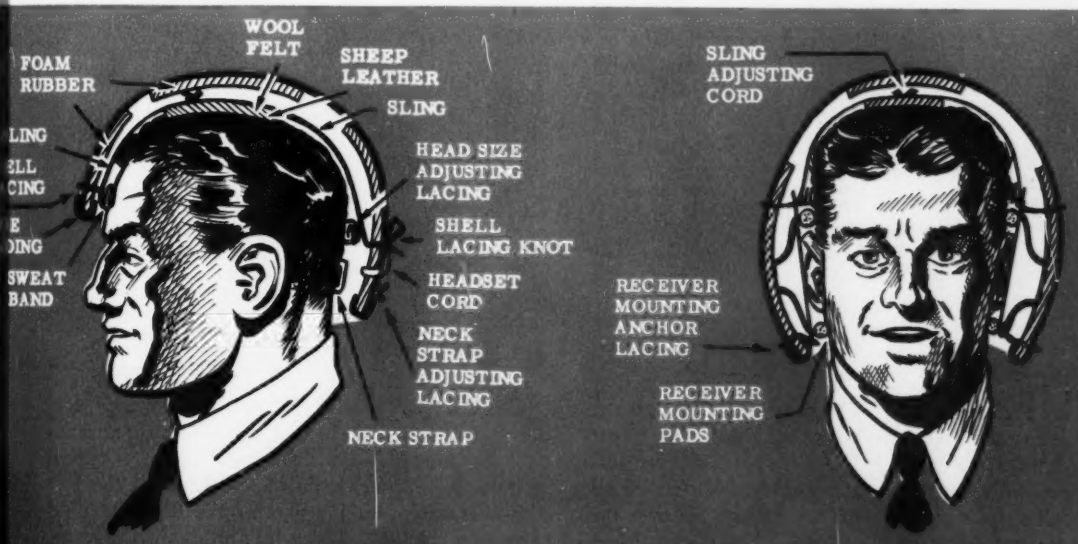
pulls the helmet down on his head with a rotating motion. The front edge of the helmet should be well down on the forehead but not enough to restrict vision.

In many instances, supply shortages have necessitated the pooling of helmets. This shortage is expected to be alleviated in the very near future when pooling of helmets can be held to a minimum. Unless the helmet is adjusted to the individual, its comfort and protection is considerably impaired. Some things, your money, your car, your phone numbers, can be lent to your friends, but those items of equipment whose perfect fit is essential to your health and well-being should be cherished lovingly and jealously guarded. Cry "Nay" to the man who would borrow it.

In a great many instances, flight surgeons have credited protective helmets with the prevention of head injury during accidents. In other cases the helmets have prevented accidents that might have resulted from momentary unconsciousness of the pilot caused by premature canopy release, explosive decompression, or severe turbulence.

Continued and unceasing efforts are being made to obtain better materials and to determine better shock absorbing principles applicable to protective headgear. Night and day the engineers struggle at their gargantuan task as golf clubs and fishing tackle lie rusting in the closet. In the light of such selfless sacrifice made to help you, your path is clear. You have no choice but to help them to help you, too. Failure on your part to adjust and use the helmet properly will bring their efforts to naught.

Despite great strides in recent years in the field of surgery, skulls continue to be classified as non-replaceable items. The best method discovered to date of insuring that you are never without one of these items of essential equipment is to take care of the one you have. It may be some time yet before replacement parts become available.



a. *Head Circumference:* The size adjustment is made by taking up or letting out the head band lacing located behind the sweatband ends.

b. *Earphone Pad Pressure:* The adjustment of the neck strap should be made to pull the side plates and mounting pads against the sides of the head for greatest comfort and for sealing out external noise. The strap should ride against the neck at the base of the skull. The adjustment is made by taking up or letting out the cord lacing located on the ends of the strap on outside of the shell above the back edge of helmet.

c. *Head Depth:* The center sling cord loop located above the center pad in the crown of the helmet may be let out or taken up to adjust earphone pads to correct height. In no case should the maximum depth for your head permit the shell to be less than ½" from the top of the head.

d. *Lateral Earphone Adjustment:* The earphone mountings may be shifted forward or backward by removing the lacing at the bottom anchor point and relocating the lacing in new holes punched in the mounting flange.

e. *Shell Lacing:* This lacing suspends the shell or the sling a safe distance from the head and must be kept tight at all times. Little safety is afforded if the lacing is loose. The ends of the lacing are located on back of the shell above the neck band and holds the communication cord in place.

f. The depth adjustment loop in all helmets with nylon slings should be tied, then the ends of the cord doubled back through the webbing loops and again tied. This lessens the amount of stretch and will absorb higher shock loads with less travel of the shell.

g. All lacing ends should be securely tied with square knots and any excess lengths of cord ends tied off with double bow knots. (Watch those granny knots, men, and check with your local Boy Scout troop if you don't know the difference.)

CHECK THAT RAMP

By Capt. Wendell F. Moseley, 5th Rescue Squadron, Biggs AFB, Texas

INSIDE the hangar, AF 1234 rested on the concrete floor with its hot engine cooling after a three-hour flight. At the BOQ, Lieutenant Doe stood under a hot shower, relaxing. All was serene with plane and pilot but not so with the crew in the rescue control center.

Pilot Doe had filed a VFR flight plan but en-route radio failure left him unable to make position reports.

The plane landed at an Air Force Base, but the tower did not notify operations nor did the pilot bother to close his flight plan properly with operations. Instead, he contacted a radio mechanic on the line who told him they would tow the plane into the hangar and repair the radio for him the following morning. Then, pilot Doe went for a hot shower, a meal and a good night's rest before clearing for distant points, oblivious of the emergency which existed in the rescue control center because he neglected to file his arrival report.

The Air Rescue Service alert officer, upon receiving the first notice of an overdue, began contacting stations along the route of AF 1234 to ascertain the probability of the pilot's landing at another field, but all reports were negative. The flight crossed the corners of three different states and messages were sent out to state police units, Civil Air Patrol squadrons, and forest rangers of each state. Alerts were flashed to all CAA installations, Air Force and Navy units; in fact, they were even sent to the local commercial broadcasting station to flash an advisory to all listeners to report rumors of an aircraft crash, but all reports still remained negative. CAA and the police checked all small fields and possible landing places all over the three states—negative.

From all appearances this was going to be a search involving many airplanes and personnel. Rescue flight crews of pilots, engineers, radio operators, scanners, medical and Para-Rescue personnel were standing by for takeoff. It was nearly three hours before complete darkness, allowing time to make a search along the route of the plane.

Then the alert officer decided to request one more ramp check of all bases before dispatching the search planes. Again, long distance telephone calls and extensive use of Plan 62, but the answers were negative. So the crews departed to their respective search areas.

The radio mechanic who helped to tow the plane into the hangar happened to pick up a late newspaper which contained a story about the missing plane. "That's funny," he muttered, "I helped put that plane in the hangar this afternoon. Better call the airdrome officer." So he called the AO and told him that he had not realized at the time that an alert existed, so he had towed the plane into the hangar to repair it.

Soon the telephone rang again in the alert room of the rescue control center and the AO advised the alert officer that the plane had been located in the hangar at the same base that was the home of the rescue control center!

Quite ironical, isn't it? Nevertheless, it does happen. The circumstances aren't always the same as in this story, but they are similar. The AO had pulled a ramp check, as directed, but he had not gone far enough. He saw only those airplanes which sat before his eyes as he sped down the ramp in his jeep.

Certainly the first fault lay with the pilot for not properly closing his flight plan with operations, and the tower should have made some mention of it to operations as a double check, but it showed a definite laxity on the part of the airdrome officer who was not too thorough with his all-important ramp check.

Incidents such as this, with their waste of money and manpower should never be allowed to happen. (U)

ERRR, AH, HELLO FLIGHT SERVICE

By Richard G. Immig, 1st Lt, USAF, March AFB Flight Service Center

PRIOR to 1 May 1950, hardly a day went by but what a conversation such as this took place: "Err, ahhh, Hello Flight Service. I'm at Tucson, Arizona, errr at the Municipal Airport, errr I'm flying AF 199, a-ah C, that's C like in Charlie, 45, that's four five, and I'd like to plan a flight or rather file a flight plan to Bakersfield, California."

The Dispatcher replied: "All right, sir, how did you wish to go?"

"Errr—what do you mean, How?

"Well, sir, did you want to go airways or direct?"

"Oh, well I guess I'll go airways."

"All right, sir. What airways did you want?"

"Oh, err, well I dunno. A—What airways do you have running up thataway?"

Excessive telephone bills for that sort of flight plan filing probably had some influence on the recent change in communications procedures.

In a move to reduce the operating expenses of Flight Service throughout the United States, without decreasing the efficiency of Flight Service procedures, a plan was developed jointly by the Department of Defense and the Department of Commerce for greater utilization of Civil Aeronautics Administration communications facilities.

One can consider, however, that despite needless telephone bills, the many thousands of dollars spent for flight service were well spent. During the course of last year, Flight Service is estimated to have "saved" 327 lives and over 10 million dollars worth of aircraft. This valuable service to military pilots is not to be abandoned but is to be included in the existing CAA facilities. In the past, seconds after the plane became airborne, a copy of the flight plan was forwarded to one of the Flight Service Centers where it was processed and closely checked by a qualified Air Traffic Service Officer. The Flight Service Center might find, in checking the flight plan, a discrepancy that would threaten the safe completion of the flight, if it were to go uncorrected. The pilot en route would then receive a Flight Service Advisory telling him of the dangerous condition and suggesting an alternate procedure. The value of these advisories is easily seen when you examine the statistics for the month of March. A total of 3079 advisories were issued, resulting in over 1300 pilots changing their flight plan.

Under the new plan, advisories will be issued only when they are specifically requested by a

pilot in flight, or when an organization, such as a squadron operations requests that a certain flight be advised. This economy-motivated cutback in advisory service is coming into effect because it is believed that pilots are generally capable of precise flight planning.

This change in procedure makes it advisable for every pilot to stop and evaluate himself: Do you THOROUGHLY PLAN your flights; do you check ALL information that is available to you; once in the air, do you continue to monitor CAA frequencies and recheck the weather well ahead of you? If you don't, your chances of becoming a statistic on a Form 14 are improved. Remember though, pilots may and are encouraged to request from Flight Service any information they may need.

Another feature of the plan is that military pilots will at all times monitor CAA frequencies and will make VFR position reports to CAA communications, who, in turn, will log them for future reference in case a search is necessary.

The new modification of the Military Flight Service Communications System should prevent the confusion and duplication which has resulted in the past from reporting to and receiving information from two distinct and separate communication systems.

One situation that can not be changed without pilot cooperation is the lack of planning which goes into many Air Force flights.

The Department of Commerce, Civil Aeronautics Administration and your Flight Service Centers are in the game to help and advise you. Use the insurance they offer you in planning a flight. (U)

FLYING SAFETY COUNCIL

MIGRATORY marine birds, returning seasonally to sanctuary on Johnston Island in the middle of the Pacific Ocean, obey no orders from any control tower yet devised. They come in for landings at any time, and in any weather. Individually, and in flocks, they constitute a flying hazard to the aircraft of the Military Air Transport Service, Pacific Division.

MATS Pacific Division, faced with the requirement for careful operations on long overwater flights must meet many problems aside from the traffic-unconscious gooney birds every day.

To study and take prompt command action in flying safety matters throughout the entire command, the Pacific Division Flying Safety Council was established in April of 1949, at both Division and Wing levels to increase the dissemination of information on potential accidents.

Previously, the operating units of PACD had handled all threats to safety through local corrective action. This procedure, while effective in a limited area, did not give full benefit to the entire Division, which was denied the benefits of preventive knowledge of potential causes of accidents gained by individual units.

Since flight safety is a function of primary concern to each commander, all reports submitted are required to bear the personal comment and signature of the commanding officer or commander concerned. The Division Flying Safety Council meets on the 27th of each month—or the nearest working day—and its minutes are mimeographed and distributed to units of the command. Such units may then use the council minutes as authority for such action as may be indicated.

Flying safety officers are established at group, squadron and detachment levels. They are charged with the following responsibilities:

(a) To render reports of all mishaps and mechanical hazards relating to flying to the appropriate wing flying safety council, to assure availability of material upon which constructive recommendations affecting flight safety can be based.

(b) To forward recommendations, through normal channels, to the appropriate wing commander. These must arrive not later than the 10th of each month.

From the large number of reports and recommendations received every month, the wing flying safety councils can keep abreast of developments in the field and at low echelon operation levels. The wing councils then:

(a) Review and take appropriate action on the flying safety reports received from groups, squadrons and detachments.

(b) Take steps to conduct a comprehensive flying safety program within the individual wing.

(c) Recommend policies to the wing commander for improvement of flying safety.

(d) Forward recommendations through the wing commander in time for arrival at Pacific Division Headquarters by the 20th of each month.

With all wing information at hand, the Division Flying Safety Council can:

(a) Review, consider, and take appropriate action on flying safety reports received from the wings.

(b) Institute and conduct a comprehensive flying safety program within the entire command.

(c) Recommend policies for improvement of flying safety to the commander.

(d) Furnish all of MATS, through channels, with specific information and recommendations rela-

tive to flying safety, for dissemination to the services.

The birds of Johnston Island came in for consideration under this system. The problem, with suggestions, moved up from the crews at Johnston through their flying safety officer, to the wing council and finally to the Division Council. Since the birds flying could not be stopped, nor diverted, and since the migrations were seasonal, specific briefings now advise pilots landing at Johnston of that particular hazard, and the best ways of avoiding possible danger.

Ditching has also been the subject for serious study, with the result that recommendations are now in effect requiring crew members to attend wet ditching drill once yearly and dry ditching once quarterly, and to have emergency water-proof battle lanterns provided for each aircraft. If a plane must put down at sea, the lanterns, with their independent source of power, are available for illuminating both inside and outside of planes during the time of moving into life rafts.

Standard procedures, such as putting ground crews into white coveralls for night operations, and emergency measures, including night identification of Haneda Air Force Base by a 60-inch searchlight, are considered, weighed, and reported upon by the Flying Safety Council.

Representation at each council meeting includes such diversified activities as the Deputy Commander, PACD, presiding at each gathering; staff officers assigned within operations, training, and aircraft maintenance; flying safety officers; medical officers, recorders and analysts.

Reports of "Mishaps and Mechanical Hazards," which are required to be submitted by pilots, form another basis for discussion and preventive action by the Council. New standard operating procedures and materiel modifications are recommended by the council when such reports of potential dangers to air safety are brought to its attention. Incidents reported to the council concerning operational techniques are discussed and when considered necessary, test flights relative to the point in question are accomplished and the results made known throughout the command.

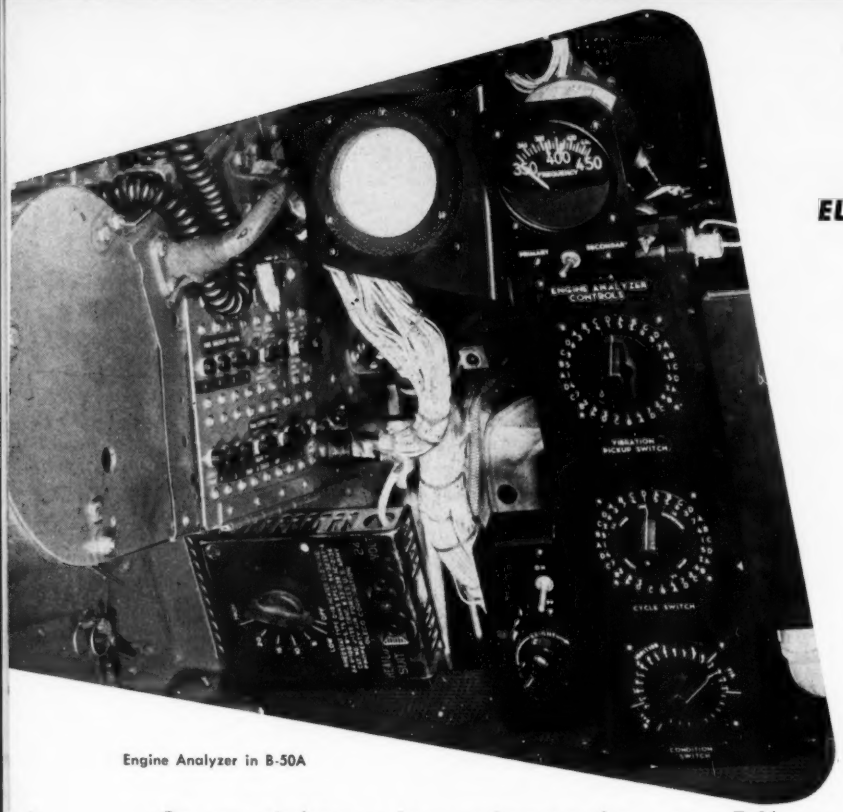
A recent experience in the Division involved a C-54 that lost engines 1 and 2 while three and one-half hours from destination on an overwater flight. The pilot, in this instance, used five to 10 degrees of flaps upon loss of the second engine during the "squaring away" period. Flight tests sponsored by the council established that the use of flaps under these conditions is inadvisable and results of the test, including air speed, cylinder head temperature, and power settings, were forwarded for proper dissemination.

Another cause for publishing a new SOP was the incident concerning a C-54 airplane in this command where major damage was caused by cargo hitting the tail of the plane through improper jettisoning procedure after the failure of one engine and subsequent inability to maintain altitude. Once again, flight tests were conducted and results of power, cowl flaps, and wing flaps settings, optimum airspeed and use of emergency exits for dumping cargo were compiled and appropriate recommendations made by the council.

The Pacific Division Flying Safety Council is considered by the command as a most efficient and constructive weapon in combating aircraft accidents. It is especially effective in quick dissemination of corrective and preventive action. (U)

Pacific Division MATS Flying Safety Council—Left to right are Maj. Charles V. Fowles (Maintenance); Lt. Comdr. E. F. K. Jennings (Plans & Operations); Capt. James D. Otis (Chief Pilot); Capt. Leon M. Tannenbaum (Flying Safety Officer); Brig. General Harold Q. Huglin (Deputy Commander PACD MATS); Col. James G. Moore (Flight Surgeon); Comdr. Elvin L. Farrington (Director Operations); Maj. William A. Crawford (Personnel); and Maj. Robert W. Springfield (Training).

ELECTRONIC TROUBLESHOOTER



Engine Analyzer in B-50A

On some airplanes, at least, no longer need a pilot's write-up on the Form 1A following a flight be a vague "Nos. 3 and 4 engines running rough." Instead, his entry might well read, "gap too large on right spark plug, No. 6 cylinder, No. 3 engine; exhaust valve seating improperly, No. 3 cylinder, No. 4 engine."

Such a detailed in-flight determination of engine malfunction is made possible by a new Sperry electronic engine analyzer. The Air Force has procured 45 of these analyzers for installation in B-50D's, C-97A's, and B-36's. The analyzer has previously been tested in a B-50A and is being used by some commercial airlines. As a maintenance tool, the engine analyzer can locate and make positive identification of malfunctioning components in the complete aircraft power plant. It provides a continuous and instantaneous indication of engine troubles in flight or on the ground. The analyzer is so specific in the indications registered that it can pick out, for example, the improper operation of a single spark plug in the entire ignition system.

In contrast to the analyzer, present instrumentation cannot adequately monitor in-flight performance of today's complex engines. For example, as many as four faulty spark plugs in a 28-cylinder engine on a B-36 or a B-50 can go undetected by the standard magneto check used for years as a trouble spotter. Yet, four faulty plugs occurring in certain sequences can cause dangerous stresses.

Troubles in the ignition and fuel distribution systems and mechanical difficulties can be identified by the analyzer at the moment they occur or when the difficulty is just beginning to develop. While flying a mission, the flight engineer in a B-36, for example, can thoroughly examine each of his six engines at regular intervals. By watching electrical pictures on a cathode-ray indicator, he can spot difficulties long before they would ordinarily become apparent.

Engine components free from operating troubles show a characteristic pattern which can be taken as the normal pattern, while each trouble produces a particular pattern which identifies the nature of the trouble. The flight engineer selects the engine component he desires to inspect through the use of his three selector switches and determines engine malfunctions by interpretation of the pattern on the indicator tube.

Using the analyzer, he can get a reading on any one of 336 spark plugs in his B-36 in the few seconds required to twist knobs. Knowledge of engine

conditions while the airplane is in flight warns the crew either to make corrective adjustments, or where more serious troubles are anticipated by the analyzer, to alter the flight plan.

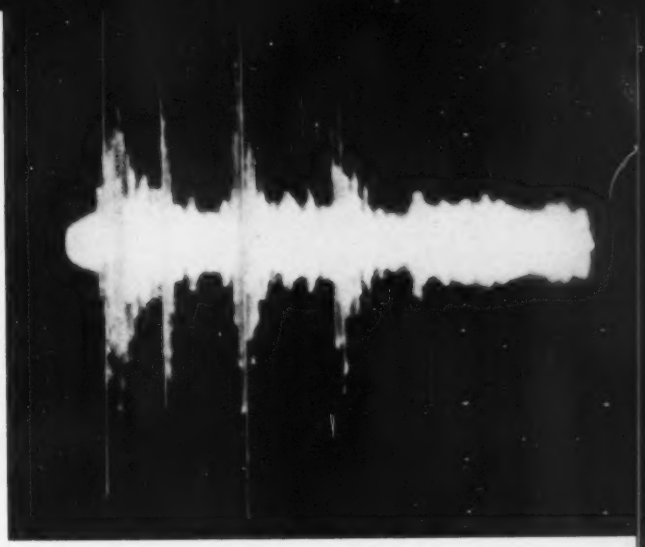
After landing, the flight engineer can present a specific list of maintenance items which shows the ground crew each particular part that must be serviced to maintain peak engine performance. Ground crewmen can service the component directly without spending time to search through the entire engine. The traditional trial and error methods of maintenance trouble shooting are thus being replaced by scientific techniques.

In addition to the value of the analyzer as a maintenance tool, it also serves as a flight instrument for cruise control. It is anticipated that in this role, the analyzer will considerably extend the range of present aircraft. Although it has been used as a cruise performance monitor on experimental flights in smaller aircraft, its application to cruise control on B-36 and B-50 aircraft must still undergo extensive flight tests before it can be considered operationally successful on these bombers. The analyzer's value in cruise control is its ability to detect and locate detonation in aircraft engines the instant it occurs.

Conventional instrumentation on airplanes will not show detonation until cylinder head temperatures rise to a dangerous point. This requires large safety factors which limit fuel mixtures and power outputs in order to preserve the engines and avoid fatal damage. With the analyzer, however, greater power outputs become possible with fuel mixtures made lean exactly up to the detonation point. Also spark advance controls can be set to the best timing for in-flight engine conditions which exist at the particular moment. This increased efficiency can save fuel and thereby extend range.

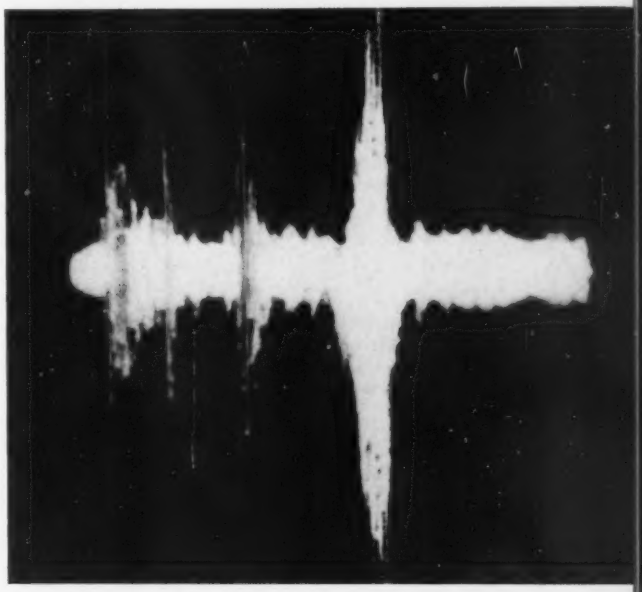
A program to train Air Force flight engineers and ground crew maintenance personnel in the effective use of the engine analyzer is being established at Carswell AFB by the Eighth Air Force Operational Engineering Section under the direction of Brig. General C. E. Irvine.

The importance of engine analyzers to aircraft operators is measured in terms of (1) increased aircraft utilization, (2) reduction of maintenance expenses, (3) more efficient operating methods, (4) increased safety. In view of the fact that the engine analyzer is new to the Air Force and relatively new to the entire aircraft industry, the entire capabilities have not been completely explored. Additional uses are being found for it every day. (U)



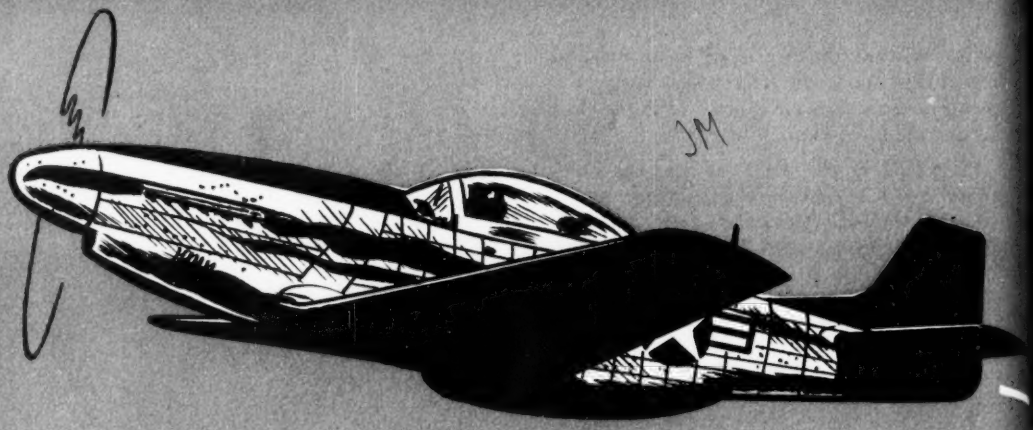
NORMAL VIBRATION PATTERN

Noises that occur in a normally operating engine produce a pattern like this on the analyzer scope. The four outstanding pips (left to right) show normal noise resulting from (1) exhaust valve closing, (2) fuel injector noise, (3) intake valve closing, (4) combustion noise. Mechanical difficulties in the engine produce noticeable changes in this pattern.



HOW DETONATION LOOKS ON ENGINE ANALYZER

Detonation, which is the instantaneous disintegration of the cylinder charge, produces a hammer-like blow to the cylinder walls that shows up as an abnormally large combustion pip in the engine analyzer scope pattern. (Sperry Photos)



transition to fighters

By MAJ. L. G. TAYLOR

"THE pig gets them used to the thunder. That's half the battle." So says Capt. A. P. Hahn, Jr., Commander of the 3596th Training Squadron at Nellis AFB, Nevada.

Instructors and higher-ups at the Las Vegas fighter training base are thoroughly convinced that their nine piggy-back F-51's have done more to improve the training program and have been a bigger shot in the arm to flying safety than any other procedure or innovation which has been introduced at the school. Cadets now are required to fly a minimum of five hours with an instructor in the two-place F-51 before they are checked out for solo flight. It's a scramble to get the time because maintenance problems of the piggy-back are much more severe than in the single-place fighter. However, the five-hour policy is strictly adhered to. And it has paid off.

Flying the dual F-51 with an instructor before they fly solo has been found from the psychological angle to be tremendously effective with student pilots. At first the policy was to give only the more backward students one or two rides in the pig before turning them loose. The result was that over 60 per cent of the students received no dual instruction. It was found that those students who received dual instruction improved very rapidly, often surpassing those who had previously been considered much better.

Obviously, the next step was to give all student pilots some instructional time in the piggy-back and to give them enough so that they would not feel they were stepping into some strange, new powerful monster on their solo checkout. The simple fact that students are now accustomed to the roar, the "thunder," of the more powerful engine makes them feel more at ease on their first solo flights. And they do much better.

From the time a new class of students arrives at Nellis AFB, the emphasis is on fighters and safety. The first few days are taken up with the many things which go to make up "processing," then the students are rechecked in the T-6. After they have been at Nellis for about 10 days they are each given an F-51 manual to study. A week later they have accumulated 20 or 30 hours in T-6's, have become acquainted with their instructors, and more important, the instructors have had a chance to catalog each student's flying habits and techniques. Then the piggy-back starts coming into its own.

Approximately five weeks after the class arrives, most of the students have received five hours of instruction in the pig. They then start receiving their solo checkouts in the single place F-51's. Once the student starts his actual solo flying training in the F-51, he is through with the T-6 except for instrument practice under the hood. The reason for this is that switching between the F-51 and T-6 from day to day actually retards the student's progress. At this point the student's flying proficiency is not developed sufficiently for him to make the changeovers safely.

The first four solo flights are called engineering missions. They are aimed at familiarizing the student with the characteristics and capabilities of the airplane to ready him for the next phase of instruction which includes formation, navigation and three hours of instrument practice. He has a total of

about 55 or 60 hours by the time he completes this phase of training. Recently, night flying was reinstated in the training program and the first attempts were entirely satisfactory.

Flying safety receives a lot of attention at Nellis AFB. Emphasis is primarily on prevention although considerable attention is also given to lessening the severity of accidents which do happen.

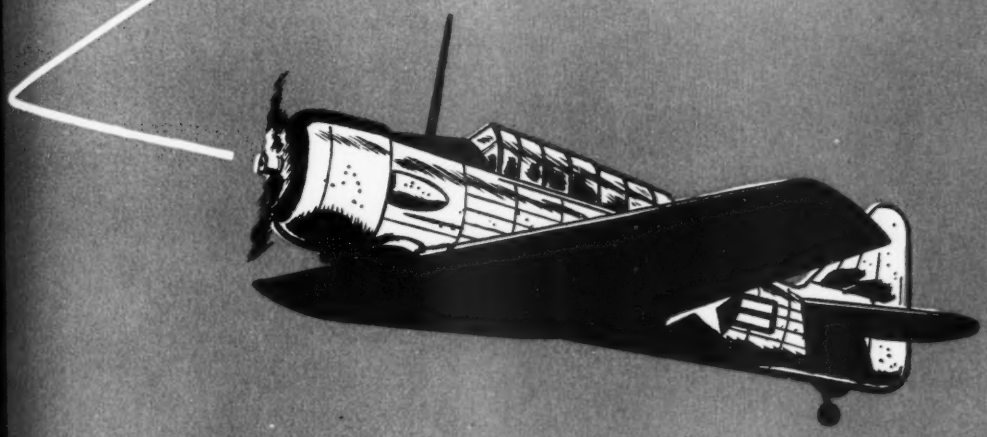
Thorough ground instruction is provided all students before their first rides in the piggy-back F-51. A recent addition to this phase was an F-51 captivair trainer which it is believed will prove most valuable. The captivair is actually an F-51 embedded in concrete to keep it from running away when the students give it the needle during their cockpit and engine procedure practice. Here they learn to start and stop the engine, gear and flap procedure, and power application; they get acquainted with all the instruments, and very important, they hear the "thunder" and get used to it. The biggest shortcoming of the captivair trainer is that it does not simulate torque which causes students so much trouble during takeoffs and go-arounds later on.

The standard, level 360° overhead traffic pattern has been modified at Nellis AFB to allow for the low experience level of students. The breakaway is accomplished two-thirds of the way down the runway and the banking angle never exceeds 45°. Students are required to fly definite downwind legs so that they will be straight and level when they lower their gear and accomplish their pre-landing checks. In the event of engine failure anywhere in the traffic pattern, an F-51 can glide to the field.

Definite periods are scheduled for T-6 and F-51 takeoffs and landings so that for the most part all student planes in the traffic pattern at any one time are of only one type. A rated officer is present in the control tower during all student flying. He supervises traffic control up to the time the student turns onto the final landing approach. The mobile control unit then takes over.

Two instructors are always present in the runway control during student operations. One actually controls the traffic while the other grades each landing. These grades, with comments on each student landing, are displayed on a bulletin board for the information of both students and instructors. The alert ground control has prevented many wheelsup landings as well as many accidents of a more serious nature.

The recent return of night flying to the training program failed to produce any unusual difficulties. Thorough planning and briefing of students licked the problems before they arose. For example, no student is allowed to land an F-51 at night without using landing lights. Since the landing light fits into a wheel well it cannot be used unless the landing gear is first extended. Result—no night wheels-up landing problem. Of course, there was one cadet who extended his gear but couldn't find the landing light switch. Since he couldn't land until the light was turned on, he received a bit of airborne cockpit familiarization via radio. After he landed safely, he received a more personal type of familiarization. Such incidents are rare because students are very seldom turned loose at night until they have demonstrated complete understanding of the many gadgets.



Instructors are not neglected insofar as training goes. Alarmed at the fact that he was getting new instructors with a relatively small amount of experience in fighters (recently nine of them with a total of 300 hours fighter time among them reported for duty), Captain Hahn requested and received an allocation of 1800 hours flying time to be used for increasing instructor proficiency. That allocation has been used up now, but the results were gratifying. All instructor training and standardization must be done locally.

Once each week, all instructors meet for a critique of the training program. Here, near-accidents written up by mobile controllers and instructors are brought to light and discussed, movies of student landings (taken with a dismounted gun camera) are shown, maintenance problems are discussed, (the number of instrument repairs required took a sharp drop after one such discussion in which causes and dollar costs were explained), and weekly, written instrument exams to be given to students are distributed. Instructors are encouraged to air their problems at these weekly meetings. Usually, someone has a solution.

From buck instructors up to group commanders, the flying officers of the school are unanimous in the opinion that the two-place F-51's do more to advance the training program than any other equipment or procedures. At the same time, the pigs cause more worries and troubles, primarily because of maintenance difficulties. For example, 25 per cent more general maintenance is required for a piggy-back than a conventional 51. Twenty-five more man hours are required for each major inspection. Replacement of certain parts is 50 per cent higher and many of the parts must be manufactured locally.

Because the pigs have two cockpits, instrument repair and service is almost double that of the normal plane. Because of special design, surface and engine controls require 75 per cent more maintenance. Standard tech orders cannot be used for fuel, heating, and ventilating system repair.

During a recent four-months period, the nine piggy-backs made 3,665 landings, averaging over 100 per month per plane. The value of this transition training for the students is impossible to estimate. But tire replacement and brake service required was 150 per cent above that for the single place F-51. Expensive, but certainly more than worthwhile in the confidence instilled in students when they can make their initial flights accompanied by qualified instructors.

The pigs have many shortcomings, among them being the smallness of the rear cockpit, its lack of brakes, lack of gear and flap controls, and limited visibility. Only the person riding in the front cockpit has positive control of the airplane. Much difficulty has been encountered with the interphone system becoming inoperative so that instructions must be shouted above the engine noise. In spite of the limitations, the piggy-back is still a great boon to students and instructors alike. The maintenance problem is terriffic, but a 40 per cent in commission average was boasted during the four-months period mentioned above. Everything considered, that's pretty good. At present, the only way the pig situation could be improved would be to supply more of them.

1st Lt Harry Krig, front, instructor, and Aviation Cadet Donald R Osborne, prepare to start their F-51 Mustang (Piggy Back) for his initial flight.

don't be a DRV while over the sea!

By CAPT. BANTA M. YORK, Air Rescue Service

FLIGHT to an island in the North Atlantic, just 1286 nautical miles away was almost too routine for one crew. The pilots and navigator completed and signed the necessary clearance forms and presented them to the dispatcher. The information contained on the clearance was transmitted to interested agencies—ICAO, International Civil Aviation Organization, and OCA, Oceanic Control Area, as well as to the destination. An ATC clearance was obtained and the airplane departed Newfoundland with a "good trip" wish from the tower.

As the flight progressed, the navigator relayed position reports to the radio operator, who in turn put them on the air for the everlistening OCA to receive and place on the flight plotting board. These positions also were relayed to the Air Rescue Service coordination center and again plotted on a control board.

The position reports continued to within two hundred miles of destination. Thirty minutes later, the 100-mile-out position report was due, but was not received by the OCA or the ARS centers. After anxiously awaiting another 30 minutes, with no word received, an alert was declared.

An urgent priority communications search was initiated immediately by the OCA and ARS centers, utilizing all circuits. "No News" answers poured in from the queried stations. The HF/DF net reported "No News" but listening. Rescue crews of two nations were briefed and dispatched to their aircraft to initiate search for the missing crew. Their instructions were to perform a reciprocal route search between the *last position report* and point of destination, to guard all standard frequencies including distress channels. Crash boat sections were put on standby status, with engines running. The stage was set for an all-out effort to search for and rescue the ill-fated crew.

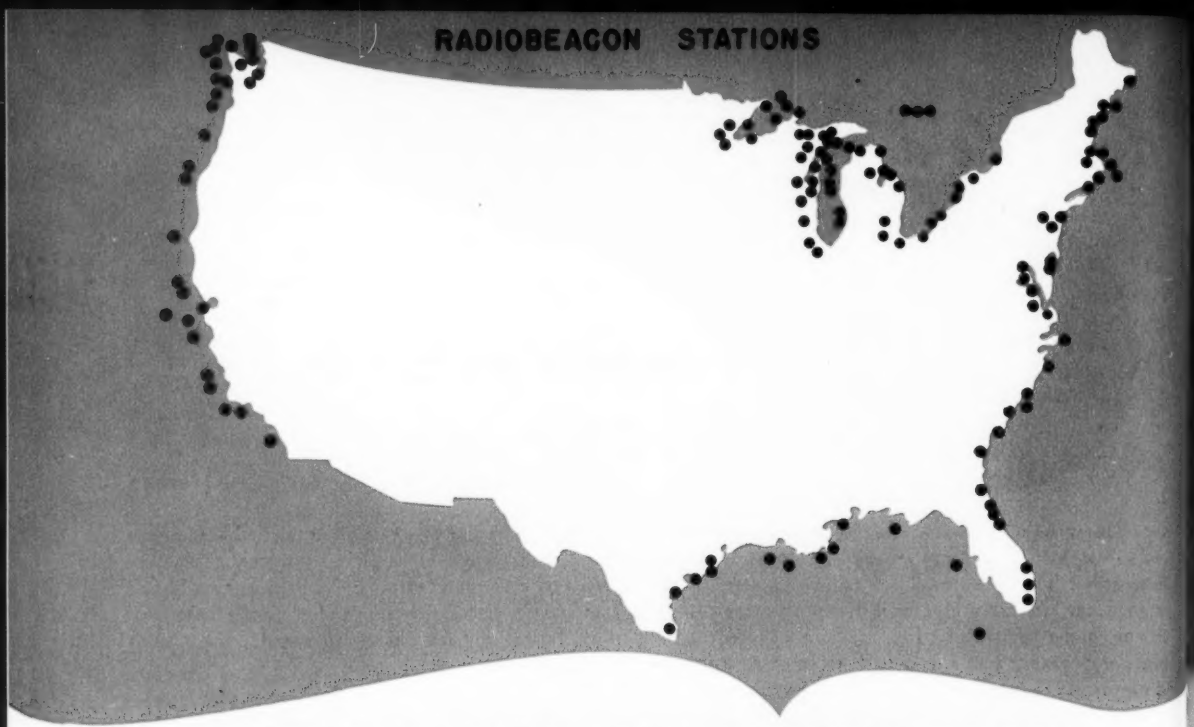
Then a message was receivd from OCA at Shannon, Ireland, that the airplane was inbound to Ireland and was expected to arrive within two hours. The rescue aircraft were recalled along with the crash boats, and instructed to stand by for confirmation.

A quick check of the distance involved between the last position report and the new point of destination precluded the possibility of the aircraft accomplishing the flight to Ireland. Again the wires began to hum with requests for confirmation of the aircraft number and destination. Within 15 minutes it was confirmed that the missing plane was indeed inbound for Shannon, Ireland, and would land within the hour.

The navagator's flight plan was checked after the plane landed. It showed that magnetic variation had been subtracted rather than added, which accounted for the flight to Ireland rather than the Azores. Of course, all position reports dispatched by the crew were based on dead reckoning and were as much as 600 miles from the actual position. This grave error would have made a rescue of the crew almost impossible, had they been forced to ditched. The fiasco also entitled the crew to full membership into the DRV, "Dead Reckoning Victim" club of the North Atlantic.

The task of locating a life raft in the North Atlantic, or any other large body of water, is tough under ideal conditions but almost impossible if the general location is not known. In this case, search operations would have been conducted as far as 1500 miles from where the plane might have exhausted its fuel supply.

In the interest of safe flight, let's eliminate the DRV from the Air Force, by reporting actual position when and wherever possible. (U)



LORAN AND RADIOBEACONS

AN extensive system of Loran and radiobeacon stations is operated by the Coast Guard in its mission of saving life and property at sea.

The Loran system is a modern electronic aid to navigation through which navigators on or over the ocean can determine their position accurately and quickly, day or night, and under practically any condition of weather and sea. The name "Loran" was derived from the words "LOng RAnge Navigation," which describe in general terms the system's relative utility when compared to ranges of other electronic navigational aids. The effective range of Loran is as great as 1,400 nautical miles at night and 750 nautical miles during the day. The accuracy obtained is comparable to that which may normally be expected from good celestial observations. Even though such precision is attained, the determination of position by Loran requires but two to three minutes' time.

The navigator can think of Loran merely as a method of determining lines of position. These Loran lines can be crossed with other Loran lines, sun lines, star lines, soundings, Radar ranges or bearings to provide fixes. Loran lines are fixed with respect to the earth's surface and the signals are on the air and available to navigators for 24 hours per day, and cover the major ocean shipping lanes of the world. Developed as a wartime necessity, the Coast Guard system is now at the disposal of private shipping, including airlines—any nation, any line. All may make free use of it.

Since radio signals travel at a constant speed, a direct relationship between time of travel and distance traveled exists. Thus, measurements of intervals of time is, in essence, a measurement of distance itself. The radio signals which are transmitted by Loran stations are not continuous transmissions such as those of everyday commercial broadcasting stations, but are "pulse" signals, or short bursts of radio energy transmitted at regular intervals. The use of "pulse" signals permits the individual signals to be identified in order that time measurements can be made. This would not be possible if the transmissions were of a continuous character.

The Loran equipment used by the navigator on shipboard or aircraft at sea in the determination of his position is known as a receiver-indicator. The receiver performs the functions of an ordinary radio receiver, but delivers its output to a visual indicator rather than to a loudspeaker, and is designed for the reception of pulsed signals rather than ordinary radio signals. The indicator is essentially an "electronic stop-watch" capable of measuring, in micro-

seconds, the difference in times of arrival of the pulse signals from the two stations of a pair.

A very rough rule of thumb has been stated to be that a Loran line of position has an accuracy of better than one per cent of the distance of the navigator from the stations; thus a navigator 1,000 miles away from the stations would expect the line of position to be well within 10 miles of the proper position.

As the stations are approached, the accuracy increases greatly, and along the imaginary line between the two stations, or "base line," a line of position may have an accuracy of the order of several hundred feet.

Loran is used by the majority of aircraft flying the various oceans. Most transoceanic airlines have found Loran to be an excellent and proven aid to navigation systems. The ease and rapidity of obtaining Loran lines lines of position or fixes is particularly useful in air navigation.

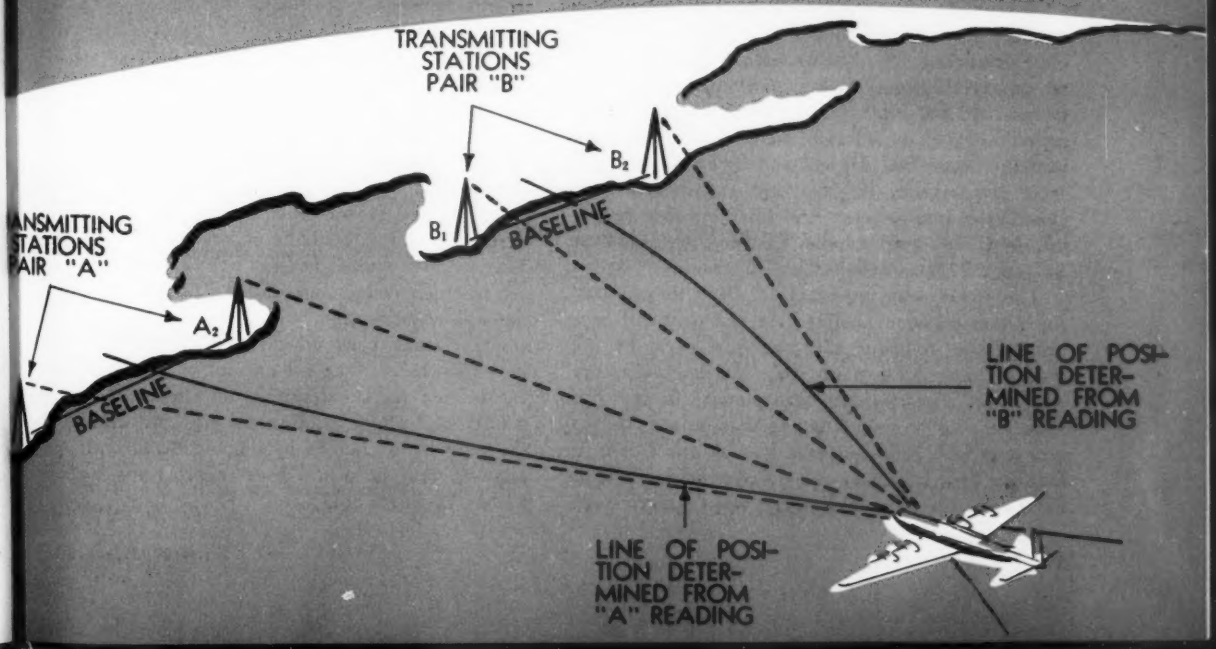
The system of navigation from radiobeacons, by means of bearings taken from direction finding equipment on shipboard, has become well established as a most important method of enabling vessels to check their positions. The radiobeacons are shown on aeronautical charts of coastal and Great Lakes areas and can be tuned in on the radio compass by airplane pilots and navigators for position checks.

There are 186 radiobeacons in operation on the coasts of this country, installed at lighthouses, on lightships, or at other points shown on the charts, and they are operated at intervals on a fixed time schedule in clear weather and continuously during fog and low visibility weather; adjacent stations on the same frequency send for successive intervals. This facilitates the taking of radio cross bearings, as does also the location in important localities of two or three stations sufficiently close for cross bearings. In this country, during periods of good visability, radiobeacon signals are sent out for one minute out of each three minutes, for one or two 10-minute periods each hour, as indicated on aeronautical charts.

It would be convenient to the navigator to have the radiobeacon send continuously without any silences, but the system of broadcasting at intervals is used as a compromise, adopted to lessen interference on the low frequency band. Radiobeacons use frequencies of 285 to 315 kilocycles.

A recently published Coast Guard booklet entitled OCEAN ELECTRONIC NAVIGATIONAL AIDS, contains considerable information of interest about these and other electronic navigation aids, both from a technical and user's standpoint. The booklet is obtainable from the Government Printing Office, Washington 25, D. C., for 50¢. (U)

Loran operates on the following principles: 1. Radio signals consisting of short pulses are transmitted from a pair of shore-based transmitting stations. 2. These signals are received aboard the ship or plane by a Loran radio receiver. 3. The difference in times of arrival of the signals from the two radio stations is measured on a special Loran indicator. 4. This measured time-difference is utilized to determine directly from special tables or charts a line of position on the earth's surface. 5. Two lines of position, determined from two pairs of transmitting stations, are crossed to obtain a Loran fix.



To
MAJ. EARL O. SMITH
78th FIGHTER-INTERCEPTOR GROUP
Hamilton AFB, California

MAJOR SMITH was assigned to flight-test an F-84D that had been grounded as a result of a reported rough engine. The engine had been given a complete maintenance inspection, nothing was found wrong and the plane was released for a test flight. A normal start, emergency check and taxi, was accomplished and during the takeoff run, the engine was smooth at 100% power. Immediately after takeoff, at 500 feet and 210 indicated airspeed with gear and flaps up, a turn was completed so as to place the aircraft on a reciprocal heading on a close downwind leg. Approximately two-thirds way on downwind leg, 240 indicated airspeed and between 1500 and 1600 feet altitude, an explosion was heard followed by a loss of power. Tail pipe temperature was 1000 degrees and flame was coming from the tailpipe. At this time the throttle was closed, the fuel selector and aileron boost turned off, and the gear handle placed down, because hydraulic pressure was falling off rapidly.

The tower was requested to clear the runway for an emergency landing. At this point it was necessary to complete the nose gear cycle by use of the emergency system, since hydraulic pressure read zero. The approach was planned so that the fighter would be in position to land as soon as the gear was fully extended with flaps down. The turn onto the final was made using a combination rate of turn and slip. Although there wasn't much time available and the flaps were being pumped down, the aircraft arrived over the end of the runway at approximately 50 feet altitude and 160 indicated airspeed in a very pronounced slip and was landed without incident.

The pilot allowed the plane to roll to where a turn could be made off the runway to clear for further traffic. The crash crew extinguished the aft section fire. Approximately three minutes flight time elapsed between takeoff and landing.

Inspection revealed that the ninth compressor stage had failed causing extensive damage to the compressor, combustion chambers, turbine nozzle, turbine wheel and tail cone.

Major Smith's clear thinking and immediate use of the procedure necessary to put the aircraft back on the field undoubtedly saved the Air Force an expensive fighter and valuable pilot.

An interesting sidelight of this incident is that Major Smith "called his shot" the afternoon before the emergency. He spoke for 15 minutes to all of the fighter-interceptor group pilots at an aircraft accident study class on the procedures to be followed in the event of a flame-out or engine failure. He briefed them extensively on the technique of maintaining a high landing pattern and controlling the point of touchdown by slipping the aircraft, not knowing that he would have to prove his theories within 18 hours. (U)

L DONE

To

1ST LT. HERBERT L. PICKETT
HQ & HQ SQUADRON, 51ST FIGHTER INTERCEPTOR WING, Naha AFB, Okinawa

AFTER being airborne approximately 10 minutes on a local flight at Naha AFB, Okinawa, and while still climbing in formation at a power setting of 99% in an F-80B, Lieutenant Pickett heard a loud explosion in the plenum chamber and the plane immediately lost power. At the time of the explosion, he was at 10,000 feet and about 20 miles northeast of the base. Immediately closing his throttle and checking for fire, he called his flight leader to inform him of his emergency and that he was switching to tower frequency.

Lieutenant Pickett headed for the field and set up his glide to maintain 220 IAS. At 3,500 feet, he established his downwind leg at this airspeed. Letting down to 2,500 feet on his base leg, he pumped the gear down and continued letting down to 2,000 feet, at 180 mph.

Without hydraulic pressure, and consequently no aileron boost, Lieutenant Pickett made a shallow turn onto the final, at about 1,800 feet and 160 IAS. When he was 50 feet over the end of the overrun strip, he put down full flaps and the airplane touched down on the runway and rolled to a stop on the taxistrip.

Inspection of the engine revealed the compressor wheel had failed. Lieutenant Pickett's thorough knowledge of his aircraft, his application of emergency procedure and his skill as a pilot averted a major aircraft accident. Through the successful landing of this fighter, it is possible that the information gained from this engine failure might help save a life in the future. (U)

To

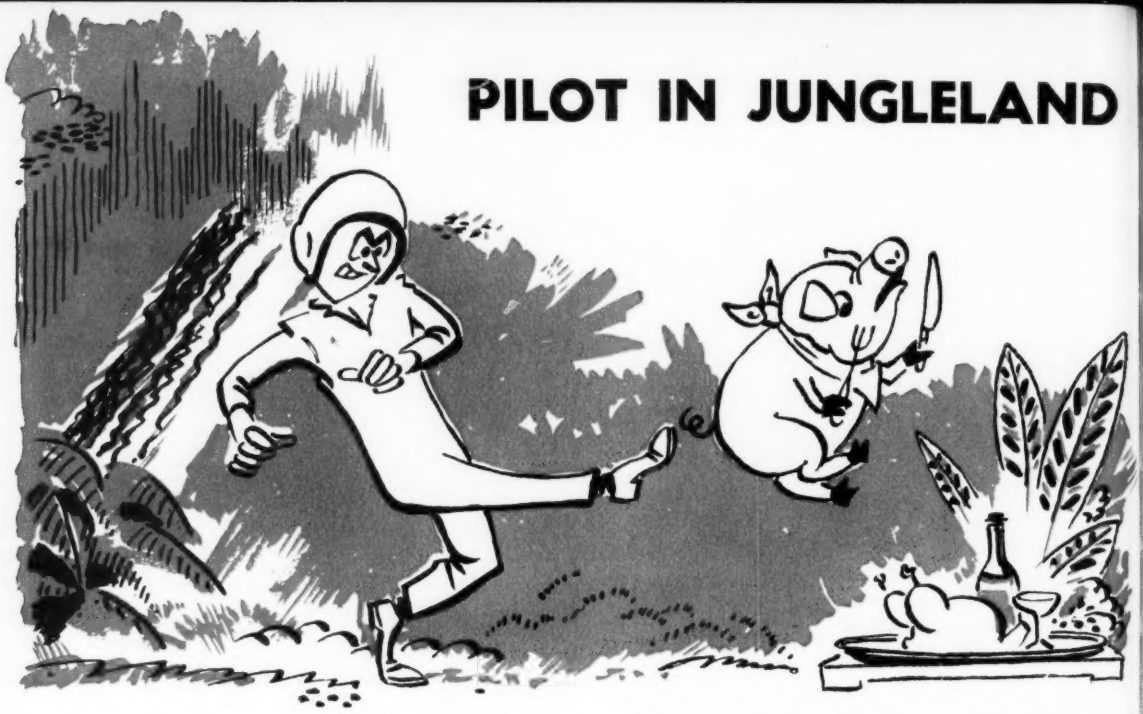
CAPT. HERBERT C. HICKMAN
3595TH PILOT TRAINING GROUP
Nellis AFB, Nevada

CAPTAIN HICKMAN took off in a B-25, acting as instructor pilot from the right seat. In the left seat was a pilot assigned for a pre-check out instruction ride. The student officer was making the takeoff, when at approximately 90 mph indicated, a loud, slapping noise was followed by severe nose gear vibration. Captain Hickman immediately pulled the nose off to reduce vibration and a successful takeoff was made. Concluding that the nose gear tire was blown out, Captain Hickman flew past mobile control and they verified that the nose gear tire appeared blown.

To prepare for an emergency landing, Captain Hickman had three of the persons aboard go to the tail gunner's compartment to make the airplane tail heavy. A nose-high landing was accomplished, with the control column full back. The aircraft landed on the maingear and dragged the tail-skid until the aircraft was slowed to approximately 10 mph. At this time, the nose wheel lowered gently to the ground and the aircraft stopped without damage.

The nose wheel tire did not blow, but it had shed all of its tread on the takeoff roll. This left only the bare tire carcass with the cord showing. Had Captain Hickman not made such a successful emergency landing, the tire would have blown on contact and a serious aircraft accident could have occurred. His superior planning and execution of the emergency landing resulted in the prevention of a major accident. (U)

PILOT IN JUNGLELAND



The time has come, the instructor said,
To speak of many things—
Of planes and ships, survival facts,
Ditchings and other things—
Of why the sun is boiling hot
And whether pilots have wings . . .

Every so often, in sessions of hangar flying among pilots and aircrews, there is a spate of speculative oratory about survival at sea, in the Arctic, desert, Times Square, Los Angeles, or the jungle—not the city type of jungle, but the hot, steamy kind with bugs, snakes, animals and cannibals.

And while pilots and crews usually have a misty idea of just what they would do in order to survive the hot, steamy kind of jungle, the jungle predicament, they are convinced, is for some poor dope other than themselves . . . and even if they *DO* project themselves into a mythical jungle situation, it isn't so easy to think of starving with a full belly. Nevertheless, there is a surprising lack of beaneries along the jungle byways and this shortage wreaks havoc with the pilot's or crewman's necessary, if somewhat ancient, habit of eating.

Both the gourmet and gourmand among aircrews may undoubtedly hoist a few eyebrows at some of the entrees listed on the jungle survival menu, but for aircrews forced down in jungle areas, hunger as well as necessity can be the mother of invention, and Dr. R. A. Howard, Professor of Botany at Harvard University, has offered some good advice to student officers of The School of Aviation Medicine.

Dr. Howard, a recognized expert in jungle survival, in his "Jungle Housekeeping" address to the Flight Surgeon class at Randolph AFB, Texas, gave the literal advice to eat like a pig and stay alive.

"Some persons stranded in the jungle," Dr. Howard said, "have had pretty good luck by watching the monkeys and eating what they eat, but it's better to watch the pigs. A wild pig has a digestive system very much like ours, and when you see one of them eating something you will know it's safe to eat the same thing. If there is not any more around, chase the pig off and eat it yourself." This was but one of many dietary rules given the sky doctors by the former wartime chief of the Jungle Survival Section at the School of Applied Tactics at Orlando, Florida.

There's plenty of food in the jungle, according to this authority, but the principal trick is knowing what to eat, where to find it, and when possible how to prepare it.

Food is to be found among both plant and animal life.

"Personally I like the plant food best," he said, "because you don't have to run it down."

But as for the animal food, the jungle expert said, any animal with hair is good to eat, and

better, of course, when cooked. If cooking is not possible, it can be eaten raw. One should eat first the muscles, second the heart and third the liver. Any animal with two shells, "bivalves" as they are called, are good, and for animals with one shell, the larger the better. Also, anything that looks like a fish is all right if it has scales, but it must not be spiny-backed, puff itself up or have a beak like a parrot. Furthermore, anything taken from the ocean can be regarded as safe to eat. Flesh should be boiled, baked, roasted or fried in that possible order.

"And in speaking of animal food," Dr. Howard emphasized, "Don't overlook the insects. They are a source of much nutrition."

"Grasshoppers," he said, "are good if you pull the legs off. So are butterflies with the wings pulled off. One airman said the latter had a faint meat taste. Wood grubs found in rotten logs are very nutritious, and so are common ants and ant eggs."

Many of the American airmen who got down in the Pacific jungles soon learned that ant hills were a wealthy source of good food. They used to dig them out for the eggs and sometimes cooked the eggs with rice.

He told of one airman whose case history he surveyed, who told this story:

"During my first days in the jungle I used to brush the ants off my food but before I got out I was brushing them back on."

As for the plant life, Dr. Howard advises that any part of a palm tree is safe to eat. Ferns are also good, especially the fiddlehead, or curled up ferns, and so are all flowers if they do not have a milky or colored sap. His advice is to leave red and white fruits alone unless you know them particularly, because the percentages would be against one who just took a chance on them. Most leafy plants are good, he explained, as are any seed that will germinate in a wet sack. Some seed have poison in them which is destroyed by germination.

Concerning water, Dr. Howard emphasized that the common belief that running water purifies itself is absolutely untrue.

"Rainwater is always the safest," he said, "and if the purity of other water is in doubt it should be purified. If no water is available the blood of a turtle or any animal life will suffice. The juice of any vine or fruit of any tree can also answer the water need, provided it is not bitter or soapy, or is not milky or colored."

Contrary to popular belief, man's greatest hazard in the jungle comes not from animal but from plant life.

"Animals and reptiles, excepting alligators and crocodiles, will usually get out of your way," he has observed, "but many plants and vines are covered with small spines. These are usually rotten at the tips and are infected with fungi and bacteria. Extreme caution must be taken to protect the body against these."

And as a final warning against insects, Dr. Howard said that the best insect repellent one can use is his own undershirt.

"Just tie up the arm and neck openings," he said, "slip it over your head and tuck ends securely under other clothing." (U)

Ramjets for 'Copters?—A leading engineer of the General Electric Company has told the American Helicopter Society that inexpensive ramjet engines may become the "missing link" to transform the helicopter into the multi-engine class. Installed on the tips of helicopter rotor blades, ramjets would provide thrust to revolve the blades thus giving multi-engine performance. Burning five times as much fuel as the conventional piston type of engine, the ramjet makes up for its high fuel consumption by being ten times lighter in weight.

Jet Bomber Gets Wing Tanks—Wright-Patterson AFB has received the first of the jettisonable wing tanks due for installation on Boeing's B-47 jet bomber. Wind tunnel tests and exploration of aero-dynamic characteristics of the tanks will be made before installation. Built of stainless steel, the high capacity tanks are to be installed inboard of each of the two-unit J-47 engines in the B-47.

Automatic Gun Charger Developed — Designated the Type B-1 automatic guncharger, a new armament unit for use on .50 calibre machine guns have been developed for the Air Force. The charger is driven by compressed air and can be operated by remote electrical control, by local manual control or automatically. The unit also holds the gun in retracted position for safety and cooling, automatically charges the gun when a fire failure occurs, fires the gun by means of an electro-pneumatic actuator and operates a rounds counter through an impulse switch within the charger.

◆ ◆ ◆

B-36 Modernization — Work has begun on the first of more than fifty B-36's scheduled to undergo modernization at Convair's San Diego plant. Four jet engines will be added to each plane along with other modifications.

Beacon Standards Revised — CAA has revised its standards for intermediate fields and airways beacons in the interests of economy and efficient operation. Study of the use made of these facilities has indicated that safety requirements of present-day aircraft can be met if CAA provides enough intermediate landing fields to achieve a spacing of 200 miles between suitably lighted airports in flat terrain and continue the 100-mile spacing in rough terrain, and if it operates beacon lights which mark airports and hazards or define a point on an airway in mountainous terrain.

Rocket Plane Tests Scheduled — USAF has announced flight tests will begin early next year on a tiny rocket plane designed to hit a top speed of 1700 mph. The plane is the X-1A, successor to the X-1, and is made by Bell Aircraft Corporation. To be equipped with a turbine-driven fuel pump, the X-1A is designed to fly at an altitude of 15 miles. The new type fuel pump will permit the rocket plane to operate 2.5 minutes using the pressurized nitrogen fuel system.

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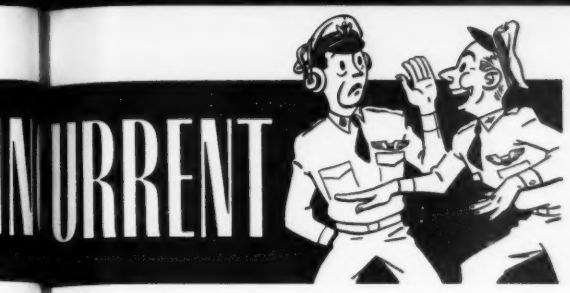
Skydrol Being Tested — Flight tests of the newly developed Skydrol, a fire resistant hydraulic fluid, are being carried out by the Douglas Aircraft Company. Through the cooperation of the CAA and a major airline, a DC-6 was equipped with two cabin superchargers prepared for use with the new fluid and put into domestic service. After some 300 hours of flight operation samples of the new fluid were withdrawn and analyzed. These samples showed practically no essential change from the composition or characteristics of the new fluid. The presently used supercharger lubricant drops from 25 to 30 per cent in viscosity in 250 hours and is ordinarily changed at 200 hours. Other flight tests are under development by Douglas.



Sighted Sleeve, Shot Same — After flying his SNJ into the target sleeve during a gunnery run, a Navy cadet was called before the officer-in-charge. The budding pilot explained that other students had told him he would get more hits if he held his fire until the last minute — "until you're so close that the sleeve fills the gunsight . . ."

"Were you firing when the plane hit the sleeve?" queried the officer.

"No sir," replied the student.

"Good grief!" exclaimed the awed officer, "how close did you want to get?"

Chloeeeeeeeeee! — Unable to see clearly through the oil streaked windshield of his T-6, a soloing cadet on the downwind leg stuck his head out of the cockpit for a moment and lost his earphones in the slipstream when the disconnect plug was pulled apart.

Excited because he was nearing the turn into the base leg, the cadet grabbed the mike and shouted: "Tower, this is Cadet Jones in ship number one-six-one! I just lost my headset! What shall I do?"

F-94's Radar Equipped — The Air Force has received the first of the new radar-equipped Lockheed F-94's for delivery to units. The new jet interceptors are equipped with afterburners, carry a radar operator, and are equipped and designed for high altitude, radar-controlled interception of enemy attack. The first radar-equipped F-94 jets will be assigned to a tactical group in the Pacific Northwest.

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Afterburners for Scorpions — The Northrop F-89 Scorpion all-weather interceptors are to be equipped with afterburners. The F-89 is powered by two Allison J-35 jet engines.

Ejection Cockpit Tested — Tests of a Navy-designed breakaway cockpit have indicated the design is practical. Pressurized and insulated to give protection against rarefied atmosphere and cold, the ejection cockpit is designed to serve as a parachute-borne escape pod for pilots of high-flying supersonic aircraft.

◆ ◆ ◆

New Liaison Aircraft — Following USAF evaluation of various types of light planes, the Cessna 305 will be procured by the Air Force for the Army. The Cessna has been designated the L-19, and is a high-wing all-metal, single-engine airplane powered by a continental E-190 engine rated at 213 horsepower on takeoff.

◆ ◆ ◆

Briefly Noted — SAC has taken over Ramey AFB, Aguadilla, P. R., and will move the 98th Bomb Wing (B-29) from Spokane AFB to Ramey within the next few months . . . Tactical Air Force, set up a year ago, with headquarters at Pope AFB, N. C., on a provisional basis, will be made a permanent organization in a new program to emphasize ground troop support . . . USAF has let a contract for the development of an "anchor" for small aircraft and gliders which will permit landings within a very small space . . . Overload flight tests of the C-97 and the B-50 type aircraft have successfully demonstrated that these USAF planes can carry more than the normal design loads . . . North American Aviation has purchased Sperry Zero Readers for installation in the F-95, all weather version of the F-86 . . . The XH-17, jet-propelled Air Force helicopter, was damaged when it tore loose from mooring during tie-down tests.

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Viking Rocket Sets Record — The Navy's Martin Viking rocket has reached a height of 106.4 miles to set a new altitude record for a single-stage American-built guided missile. The Viking rocket, nearly 50 feet long and 30 inches in diameter, was fired from the deck of a ship in the mid-Pacific. The previous established record was 78 miles.

Cross Feed

FLYING SAFETY IDEA EXCHANGE

Hitch-Hikers — Four emergency-leave hitch-hikers were set up for a ride westbound. They had properly cleared through our lounge facilities set up for hitch-hikers. Prior to takeoff, the pilot was approached by four "Johnny-come-latelies," and he, unknowingly, agreed to take them with him. When departing time came, the four emergency-leave passengers were told "no room." After interceding and explaining our handling of all hitch-hikers, to the pilot, he agreed, and scratched the four "line crashers."

This base maintains a hitch-hikers lounge near, but not in the operations building. The orders of all people seeking rides are checked, thereby insuring pilots of carrying only authorized passengers. A priority system is in effect that assures fair treatment for all. It also eliminates personnel lounging around operations soliciting rides. This enables pilots to check weather and file a clearance with a minimum of distraction.

All pilots can assist along these lines by refusing rides to any personnel not clearing through proper channels. The cooperation of all will insure fair play for all. (U)

CAPT. DANIEL E. EGAN
Flying Safety Officer, Kelly AFB

◆ ◆ ◆

Air Fair — An air show is too frequently regarded as a thrill-chill-spill affair which attracts spectators who expect and hope to see daredevils risk their necks. The Air Force has endeavored to make its air shows safe and sensible displays of air power rather than circus stunts.

Along this line comes a collection of ideas which may help units that wish to put on educational displays for their local communities. Detailed helps in planning and operating an Air Fair are included in a booklet which can be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at 20 cents a copy. The publication was prepared by the Civil Aeronautics Administration to develop a sound interest in aviation by educating the public in the various uses of the airplane, its economic value and place in modern life. (U)

Asbestos Pete — Asbestos Pete is gasoline-soaked, fire-eaten, mauled and tumbled. The life work of this dummy is to alert others to the need of fire prevention.

When your clothes catch on fire you must not run — for running only fans the flames, increasing your chances of being seriously or fatally burned. Instead, you should extinguish the fire by removing your clothing and rolling on the ground or by using a fire blanket to smother the flames.

Lately, this Company has placed special emphasis on combating fires that envelop clothing of the worker. To carry out this part of the program, Asbestos Pete was created and fabricated by our employees in Oklahoma City.

Actual experience gained by soaking Asbestos Pete with gasoline, setting his clothing on fire, then putting out the flames with a fire blanket — teaches employees the importance of coolheadedness and teamwork and the value of being able to depend on a well-trained fellow worker for assistance in time of an emergency.—(Phillips Petroleum Co.) (U)

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Use of Airways Stations — I think it would be a splendid idea if each pilot visited an airways station. He could see that we do not have the control tower, weather, flight service, operations and ATC all in one room. But we do have lines to all those agencies and can obtain the information he wants while he is flying.

It would save a lot of time if a pilot would request all the weather he wants in one transmission instead of two or three, as some do. One pilot may call in for a weather observation at a certain station. You give it to him and he promptly comes back with another weather request which means another "wait-out" and a phone call and another transmission to give it to him. He will roger that and request an observation at another station and a forecast for two hours at the first station. It would be so much easier to ask for the three observations and one forecast in the first transmission.

Don't take it as a personal criticism if an Airways operator corrects your time. It is a common thing to receive a position report over some station

at 50 past the hour and when the operator looks at the station master clock (which is checked four times a day with WWV) it's just approaching 48 past the hour. Tell the pilot that it's 48 past the hour and that you will correct his position accordingly and he sometimes rogers back like you told him he barked at the moon.

It isn't hard to copy a position report given correctly, and repeating the same thing over and over is a waste of time. Of course, when reception is poor, if repetition is necessary, the operator will ask you to repeat. If the operator requests you to repeat your altitude, the altitude is all he missed and it isn't necessary to go through the whole position report again. (U)

PFC. RALPH W. WILSON, AACS
Langley AFB, Virginia

◆ ◆ ◆

Safety in the Arctic — The Newfoundland Base Command's Flying Safety Award has been presented to Col. Henry Dittman, commanding officer of BW-1, Greenland, by Maj. Gen. Lyman P. Whitten, Commanding General, NFBC.

The base in Greenland accumulated 563 flying hours in the Arctic wastes without a single accident for the three-months periods beginning 1 February 1950. This commendable record is in keeping with the Military Air Transport Service (MATS) Third Year Program, which has as one of its principal aims the elimination of aircraft accidents. Awards, such as this trophy, assist the command in promoting an accident prevention program.

Safer Webbing — A longer-life treatment of parachute harness has been developed by engineers of the Materials Laboratory of Air Materiel Command. The nylon webbing used in the manufacture of this harness is now treated with a resin, Merlon-BR, to prevent fraying, thus lengthening the time of use for each harness.

Tests of the treated webbing included the use of an abrading machine where the material is pulled back and forth over parachute harness buckles many more times than will ever be necessary in its use. The treated webbing outlasts the untreated type by three times in wearing, which means that the parachute harness that formerly lasted only five months, will now be safe for use for 15 months.

Maintaining in good repair the thousands of parachutes used by pilots and crewmen of the Air Force, is one of the responsibilities of the AMC. An annual consumption of a million yards of webbing for harnesses has been standard in the past. The reduced demand will save the USAF about a million and a half dollars per year. (U)

PILOT RESPONSIBILITY

WHILE the flight advisory service, as an automatic function of Flight Service, has been deleted (see page 9, this issue), this service is still available upon request of the pilot through either military or CAA radio stations. Changes in AF Reg. 60-16 place the responsibility on the pilot to be on the alert for change of conditions while in flight and to request the information desired from Flight Service when changes occur. Flight Service can provide valuable assistance to aircraft in emergency conditions if the pilot will only contact the nearest Flight Service Center and request this service.

Flight Service is still a good "copilot." However, it will be up to the pilot to make the initial contact and not wait for Flight Service to call him. A large number of violations and accidents are the result of "not knowing." If there is any doubt in your mind, ask Flight Service through the nearest communications facility and they will provide information that will aid you in reaching a decision. Preparation is paramount to accomplishment and the proper preparation for flight includes being thoroughly familiar with the provisions of AF Reg. 60-16, which is in a manner of speaking the Flight Service rule book.

Flight Service still acts as a clearing authority for all bases without an established base operations, provides necessary information to Air Defense Control Centers regarding the movements of military aircraft within specified areas, and lends assistance to aircraft in flight when requested by the pilot, including aircraft in distress or emergency conditions. The service also coordinates plans for and assists in hurricane evacuation of military aircraft, maintains a current file of military flight plans and notifies search and rescue or other interested agencies when an aircraft is presumed to be missing or lost.

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SHARE YOUR IDEAS

FLYING SAFETY Magazine welcomes comments, criticisms and editorial contributions from all members of the United States Air Force. Readers can help the Magazine promote safe flight by offering information on procedures, equipment or training methods that have been effective in decreasing aircraft accidents. Also, whenever superior airmanship, piloting or maintenance saves an airplane or crew from disaster, we want to publish the story as a "Well Done." Address your comments to the Editor, FLYING SAFETY Magazine, Norton Air Force Base, San Bernardino, California.

~~RESTRICTED~~

FLYING SAFETY

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THE INSPECTOR GENERAL, USAF
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San Bernardino, California
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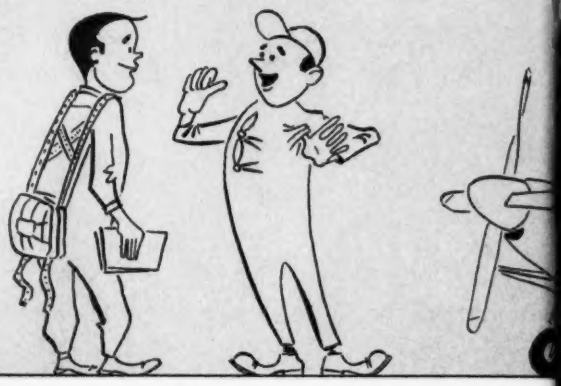
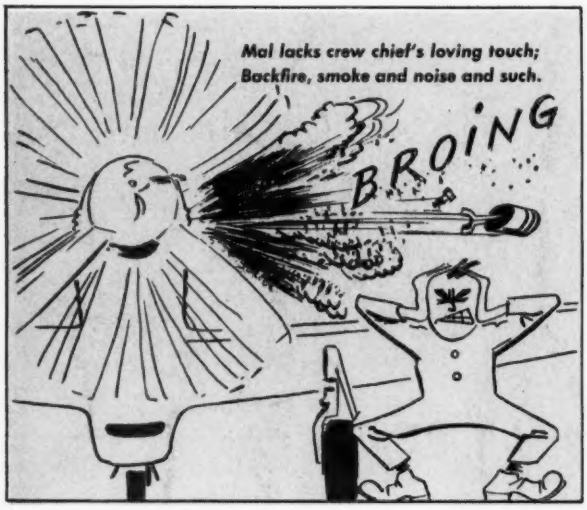
WHY?

A RESERVE pilot with an M-day assignment, having been checked out in a T-6 by a competent instructor pilot, was cleared to fly solo transition in the local area. Immediately after takeoff, he flew 90 miles to his home where he engaged in unauthorized low flying. During the course of his buzzing, the left wing hit a tree while he was in a steep bank. The T-6 cartwheeled and was totally destroyed, killing the pilot instantly. This was a violation of regulations governing flights.

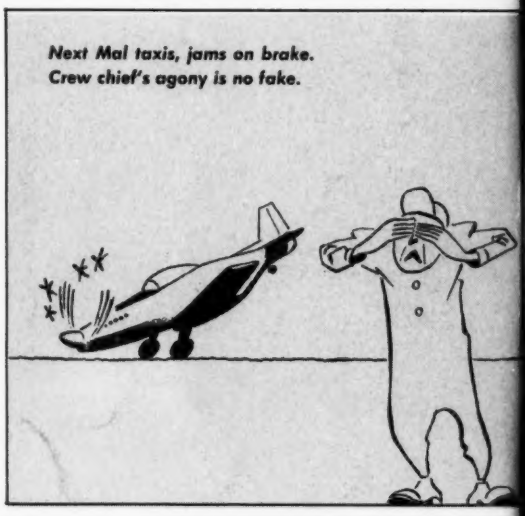
Mal Function



Crew chief very proud of plane
Purrs like cat; no stress no strain.



Mal lacks crew chief's loving touch;
Backfire, smoke and noise and such.



Next Mal taxis, jams on brake.
Crew chief's agony is no fake.

Mush-head Mal now folds his gear;
Crew chief's mental state is clear.

A dream, alas, this happy ending,
Chief cracks whip—Mal does the mending.

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